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Joel Kindem

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LEE, SHUN K

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Please find below and/or attached an Office communication concerning this application or proceeding.

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 10/776,645
Filing Date: February 10, 2004
Appellant(s): KINDEM ET AL.

Scott C. Harris
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 15 December 2008 appealing from the Office action mailed 16 January 200.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

4,429,227	DIBIANCA <i>et al.</i>	1-1984
5,550,378	SKILLICORN <i>et al.</i>	8-1996
6,078,052	DIFILIPPO	6-2000

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6,087,665	HOFFMAN et al.	7-2000
2002/0060300	O'KANE SR. et al.	5-2002
6,894,282	FREUND et al.	5-2005
WO 02/25311 A1	FREUND et al.	3-2002

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-7, 11-14, 17-21, 24, 29, and 32-52 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Amended independent claim 1 recites the limitation “wherein said bridge has specified surfaces between the pixels that hold said array of scintillator material of said array at least partly within said pre-formed reflector” and amended independent claim 37 recites the limitation “wherein said bridging portion has specified surfaces that hold said array two dimensionally within said pre-formed reflector”. Bridge surfaces that are not in contact with the pixels do not appear able to provide forces that would hold the scintillator at least partly within the pre-formed reflector. The specification discloses (paragraph 27) that “... the pixels 202 of array 201 are held in the appropriate position relative to each other by surfaces of an exit window bridge 205 spanning the gaps 206 between the pixels 202. ... the exit window bridge 205 may be made of scintillator material left uncut in the fabrication of the gaps 206. In other embodiments the exit window bridge 205 may be formed of a material different from the scintillator and attached to the exit windows 207 of the pixels

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202 ... ” and (paragraph 38) that “ ... In cases where the pre-formed reflector may not provide a snug fit for pixels within some range of sizes, a variety of provisions can be made to ensure that the scintillator pixels remain in place during use and to control the effect of any voids resulting from dimensional mismatch between the reflector and the scintillator pixels. For example, as an alternative to the press fit, the individual scintillator pixels may be held in position by bonding exit faces of the scintillator assembly to the input window or windows of the photodetector ... ”. Thus the specification teaches that in at least some embodiments, the scintillator is held at least partly within the pre-formed reflector by a snug fit or bonding. However, there does not appear to be any disclosure of how specified bridge surfaces were used to hold the scintillator at least partly within the pre-formed reflector. Therefore, the specified bridge surfaces were not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Amended independent claim 44 recites the limitations “ ... wherein said shape mates with, and is held in place by, corresponding surfaces on said preformed reflector ... and performing a protrusion on at least one of said inner surfaces of said reflector for forming at least one air gap between adjacent scintillator material surfaces and the reflector”. However when a scintillator material surface is separated from an adjacent reflector surface by an air gap, that particular scintillator material surface is not in contact with and thus cannot be held in place by that particular adjacent reflector surface. Thus, amended independent claim 44 recites limitations that appear to conflict with other recited limitations. Therefore, an air gap in combination with a shape that mates with, and is held in place by, corresponding surfaces on a preformed reflector were not described in the specification in such a way

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as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 1-7, 11-14, 17-21, 24, 29, and 32-52 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Appellant has not pointed out where the amended claim is supported, nor does there appear to be a written description of the claim limitations “wherein said bridge has specified surfaces between the pixels that hold said array of scintillator material of said array at least partly within said pre-formed reflector” or “wherein said bridging portion has specified surfaces that hold said array two dimensionally within said pre-formed reflector” in the application as filed.

Further, Appellant has not pointed out where the amended claim is supported, nor does there appear to be a written description of the claim limitations “ ... wherein said shape mates with, and is held in place by, corresponding surfaces on said preformed reflector ... and performing a protrusion on at least one of said inner surfaces of said reflector for forming at least one air gap between adjacent scintillator material surfaces and the reflector” in the application as filed.

Claim 44 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Appellant regards as the invention.

Amended independent claim 44 recites the limitations “ ... wherein said shape mates with, and is held in place by, corresponding surfaces on said preformed reflector ... and performing a

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protrusion on at least one of said inner surfaces of said reflector for forming at least one air gap between adjacent scintillator material surfaces and the reflector". However when a scintillator material surface is separated from an adjacent reflector surface by an air gap, that particular scintillator material surface is not in contact with and thus cannot be held in place by that particular adjacent reflector surface. Therefore, amended independent claim 44 recites limitations that appear to conflict with other recited limitations.

Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Freund et al. (WO 02/25311 A1) in view of DiBianca et al. (US 4,429,227) and Skillicorn et al. (US 5,550,378).

It should be noted that US Patent 6,894,282 B2 (Freund *et al.*) corresponds to WO 02/25311 A1 (Freund *et al.*).

In regard to claim **9**, Freund *et al.* disclose (Figs. 5 and 6) a scintillator assembly, comprising:

- (a) a scintillator material (4), having outer surfaces of a first shape; and
- (b) a preformed reflector (5), having inner surfaces which each mate with said first shape to contain said scintillator material (4) at least partly within said pre-formed reflector (5).

The assembly of Freund *et al.* lacks forming at least one air gap between a wall of the reflector and a surface of the scintillator material with a spacer formed by a protrusion that is part of said inner surface of said preformed reflector. However, DiBianca *et al.* teach (column 5, lines 9-34) to provide at least one air gap longer than a wavelength of light between a wall of the reflector and a surface of the scintillator material with a

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bonding material (100 in Fig. 5), in order to enhance light collection efficiency. Further, Skillicorn *et al.* teach (column 6, lines 12-13) to provide stretched wires to align the placement of scintillator elements. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to form protrusions as a part of the one-part reflector's inner surfaces in the assembly of Freund *et al.* for accurate placement of scintillator elements, in order to obtain air gaps longer than a wavelength of light between scintillator surfaces and reflector walls so as to enhance light collection efficiency.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Freund et al. (WO 02/25311 A1) in view of O'Kane Sr. et al. (US 2002/0060300) and Hoffman et al. (US 6,087,665).

In regard to claim **16**, Freund *et al.* disclose (Figs. 5 and 6) a scintillator assembly, comprising:

- (a) an array of scintillator material comprising plural pixels (4) of separated scintillator material, each having outer surfaces of a first shape, and a bridge (*i.e.*, "base plate"; US 6,894,282 column 4, lines 57-66) holding together the plural separated pixels (4) in a specific geometry; and
- (b) a preformed reflector (5), having plural inner surfaces which each mate with said array of plural separated pixels (4), to contain each of said pixels (4) of scintillator material at least partly within said pre-formed reflector (5).

The assembly of Freund *et al.* lacks that the scintillator comprises different materials and an explicit description that the plastic reflector comprises polyethylene. However,

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Freund *et al.* also disclose (US 6,894,282 column 2, lines 58-65) a plastic reflector.

Since Freund *et al.* do not disclose and/or require a specific plastic, one having ordinary skill in the art at the time of the invention would reasonably interpret the unspecified plastic of Freund *et al.* as any one of the known conventional plastics that would not require further description. Further, O'Kane Sr. *et al.* teach (paragraphs 46-49) that plastics comprise polyethylene. In addition, Hoffman *et al.* teach (column 4, lines 28-33) to provide different scintillator materials so as optimize specific detector characteristics. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a known conventional plastic (*e.g.*, polyethylene) as the unspecified plastic in the assembly of Freund *et al.*, and to optimize specific detector characteristics by providing different scintillator materials.

Claims 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freund et al. (WO 02/25311 A1) in view of DiBianca et al. (US 4,429,227) and Skillicorn et al. (US 5,550,378) as applied to claim 9 above, and further in view of DiFilippo (US 6,078,052).

In regard to claims **22** and **23** which are dependent on claim 9, the modified assembly of Freund *et al.* lacks a light guide (*e.g.*, a wavelength shifting optical fiber). However, wavelength shifting optical fibers are well known in the art. For example, DiFilippo teaches (column 3, line 21 to column 4, line 8) to provide wavelength shifting optical fibers in order to enhance collection efficiency. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide

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wavelength shifting optical fibers in the modified assembly of Freund *et al.*, in order to enhance collection efficiency.

Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Freund et al. (WO 02/25311 A1) in view of DiBianca et al. (US 4,429,227) and Skillicorn et al. (US 5,550,378) as applied to claim 9 above, and further in view of O'Kane Sr. et al. (US 2002/0060300).

In regard to claim **25** (which is dependent on claim 9) and claim **26** (which is dependent on claim 9), Freund *et al.* also disclose (US 6,894,282 column 4, lines 10-16) titanium dioxide as an additive to the reflector material. The modified assembly of Freund *et al.* lacks an explicit description that the plastic reflector comprises polyethylene. However, Freund *et al.* further disclose (US 6,894,282 column 2, lines 58-65) a plastic reflector. Since Freund *et al.* do not disclose and/or require a specific plastic, one having ordinary skill in the art at the time of the invention would reasonably interpret the unspecified plastic of Freund *et al.* as any one of the known conventional plastics that would not require further description. Further, O'Kane Sr. *et al.* teach (paragraphs 46-49) that plastics comprise polyethylene. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide a known plastic material (e.g., polyethylene) as the unspecified plastic reflector material in the modified assembly of Freund *et al.*

(10) Response to Argument

Appellant argues (pp. 11-12 in the Appeal Brief filed 15 December 2008) that places within the specification (citing paragraph 27) describe how an exit window bridge

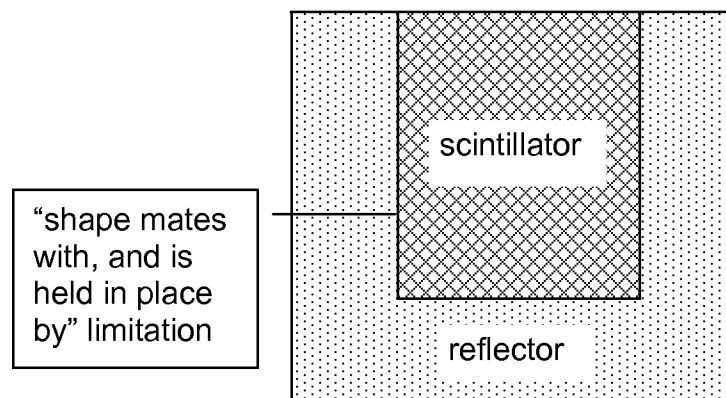
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holds the intermediate portion in place. Examiner respectfully disagrees. Amended independent claim 1 recites the limitation “wherein said bridge has specified surfaces between the pixels that hold said array of scintillator material of said array at least partly within said pre-formed reflector” and amended independent claim 37 recites the limitation “wherein said bridging portion has specified surfaces that hold said array two dimensionally within said pre-formed reflector”. Thus the claims require that the pixels (202 in Fig. 1a) are held within the reflector (203 in Fig. 1a) by surfaces of an exit window bridge (205 in Fig. 1a). Thus the issue is: does the specification as filed support or teach that exit window bridge surfaces exert forces that hold the scintillator pixels within the reflector? Each claim limitation must be expressly, implicitly, or inherently supported in the originally filed disclosure (MPEP § 2163.05). In this case, the specification discloses (paragraph 27) that in “... the embodiment shown, the pixels 202 of array 201 are held in the appropriate position relative to each other by surfaces of an exit window bridge 205 spanning the gaps 206 between the pixels 202 ...”. Thus the specification teaches that the pixels (202 in Fig. 1a) are held in the appropriate position relative to each other by surfaces of an exit window bridge (205 in Fig. 1a). However, there does not appear to be any express disclosure that exit window bridge surfaces hold the scintillator pixels within the reflector. Further, the specification discloses (paragraph 29) that in at least one embodiment, “... the final scintillator assembly, 200, comprised of the scintillator array 201 and the preformed reflector 203 after removal of the exit window bridge 205 ...”. Thus at least one disclosed embodiment comprises a final scintillator assembly without an exit window bridge (205 in Fig. 1a). Clearly, an exit window bridge (or any of the exit window bridge surfaces) is not implicitly or inherently required for the pixels to be held

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within the reflector in at least one disclosed embodiment. Thus to one having ordinary skill in the art, a description of an optional “exit window bridge” does not imply that surfaces of the optional “exit window bridge” are necessary to hold the scintillator pixels within the pre-formed reflector. Therefore each claim limitation does not appear to be expressly, implicitly, or inherently supported in the originally filed disclosure.

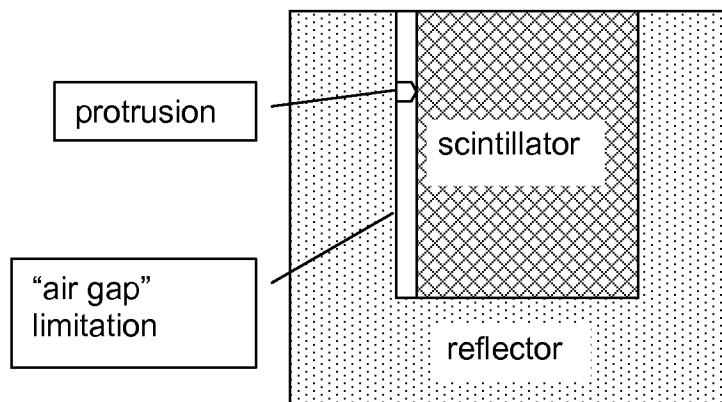
Appellant argues (pg. 12 in the Appeal Brief filed 15 December 2008) that the claim is entirely consistent since the reflector hold the scintillator material in place. Examiner respectfully disagrees. Amended independent claim 44 recites the limitations “... wherein said shape mates with, and is held in place by, corresponding surfaces on said preformed reflector ...”. Thus the claims require that each corresponding preformed reflector surface mate with and hold (in place) a corresponding scintillator material surface (see “shape mates with, and is held in place by” limitation below).



Amended independent claim 44 also recites the limitations “... performing a protrusion on at least one of said inner surfaces of said reflector for forming at least one air gap between adjacent scintillator material surfaces and the reflector ...”. Thus the claims require a protrusion on at least one of inner surface (e.g., inner surface) of the reflector. That is, an inner surface

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includes a protrusion and the remainder of the inner surface. It is important to recognize that only the protrusion is in contact with scintillator material surface whereas the remainder of the inner surface is not in contact with the corresponding scintillator material surface (see “air gap” limitation below).



However when a scintillator material surface is separated from an adjacent reflector surface by an air gap, that particular scintillator material surface is not in contact with and thus cannot mate with and be held in place by that particular adjacent reflector surface. Therefore, amended independent claim 44 recites limitations that appear to conflict with other recited limitations.

In response to appellant's argument (pp. 12-14 in the Appeal Brief filed 15 December 2008) that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only

from the appellant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

In regard to independent claim 9, appellant also argues (pp. 12-14 in the Appeal Brief filed 15 December 2008) that neither DiBianca *et al.* nor Skillicorn *et al.* teach anything about the claimed protrusion since DiBianca *et al.* would require the extra step of adding adhesive and the purpose of the stretched wires of Skillicorn *et al.* are not for forming an air gap. In response to appellant's argument, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In this case, DiBianca *et al.* teach to provide structure (e.g., "bonding material" 100 in Fig. 5; column 8, lines 9-18) that forms at least one air gap longer than a wavelength of light between a wall of the reflector and a surface of the scintillator material, in order to enhance light collection efficiency (column 5, lines 9-34). Thus DiBianca *et al.* teach or suggest that each scintillator element must be placed in precise alignment relative to reflectors and other scintillator elements, in order to enhance light collection efficiency using at least one air gap longer than a wavelength of light. Further, Skillicorn *et al.* teach to provide structure (e.g., "stretched wires"; column 6, lines 12-13) to align the placement of scintillator elements. Therefore the combination of the cited prior art would have taught or suggested to one of ordinary skill, spacers on the reflector surface for aligning the

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placement of each scintillator element surface relative to reflector surfaces and other scintillator elements, in order to enhance light collection efficiency with air gaps longer than a wavelength of light between reflector surfaces and scintillator surfaces.

In regard to independent claim 16, appellant argues (pg. 15 in the Appeal Brief filed 15 December 2008) that nothing in the cited prior art teaches a preformed reflector with different materials of the scintillator formed of different materials since Hoffman *et al.* disclose that different scintillator materials could be used for different purposes but does not disclose using different materials within pixels of a preformed reflector. In response to appellant's argument, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In this case, Hoffman *et al.* state (column 1, lines 11-33) that “... an x-ray source projects a fan-shaped beam which is collimated to lie within an X-Y plane of a Cartesian coordinate system and generally referred to as the “imaging plane” ... ” and (column 4, lines 28-33) to “... include a plurality of scintillation material layers to optimize specific characteristics of the device. The described scintillators may be fabricated so that the specific advantages of several different types of materials are combined. In addition, the scintillator may collimate the light transmission in the lateral direction ... ”. Thus Hoffman *et al.* teach or suggest that device characteristics can be optimized by using a plurality of different scintillators. Therefore the combination of the cited prior art would have taught or suggested to one

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of ordinary skill, at least one scintillator pixel (*e.g.*, a pixel at the center of the detector) comprising at least one material different from the material of another scintillator pixel (*e.g.*, a pixel at the edge of the detector) in order to optimize scintillator characteristics relative to the geometry of the x-ray source (*e.g.*, a fan-shaped beam).

In regard to dependent claims 22, 23, 25, and 26, appellant argues (pg. 15 in the Appeal Brief filed 15 December 2008) that the dependent claims should be allowable for reasons stated above with respect to independent claim 9 as well as on their own merits. Examiner respectfully disagrees for the reasons discussed above.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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